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ABSTRACT

This booklet addresses the question of what is wrong with textbooks and then shows how textbooks can be improved through the selection process. A conceptual scheme is proposed as the basis of the selection process. Specific attributes and features to look for when selecting textbooks, based on this conceptual scheme, are discussed. Five categories of selection criteria are discussed: (1) needs analysis; (2) subject-matter content; (3) social content; (4) readability; and (5) instructional design. A 35-item bibliography is included. (SI)

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Improving the Textbook Selection Process

M. Jean Young, Charles M. Riegeluth

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Improving the Textbook Selection Process

by
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Introduction

Textbooks are responsible for 75% to 90% of what students will learn on a given subject, which means they play a central role in the education of U.S. students. According to some researchers, a textbook will have more influence on what is taught in the classroom than any local curriculum guide or syllabus.

If educators select textbooks that facilitate student learning, that sends a message to publishers. If educators select textbooks that are visually attractive, that also sends a message to publishers. Publishers produce textbooks that educators will buy. It is a simple matter of economics. If educators do not buy it, publishers will not produce it. By selecting textbooks that facilitate learning, educators are telling publishers that they want textbooks to be good instructional tools.

Isn't this what we already are doing? Evidently not. If we are sending the "right" message, why are so many people dissatisfied with textbooks? Why are there cries that textbooks are "watered-down" or "dumbed-down?" So, what's wrong with textbooks the way they are? Why are so many people dissatisfied? Why did every math book recently submitted for state adoption in California get rejected?

We first shall address the questions about what is wrong with textbooks and then go on to show how textbooks can be improved through the selection process. We shall propose a conceptual scheme to serve as the basis of the selection process and then suggest specific attributes and features to look for when selecting textbooks based on this conceptual scheme.

What's Wrong with Textbooks?

Historically, the textbook was devised as a reference book from which an instructor could teach. As such, it contained a body of knowledge on a given subject; but it was not intended to "teach" by itself. However, the purpose of textbooks has gradually changed. While doing field research on textbook selection, one of the authors (Young) found that whether a teacher is a veteran or teaching a subject for the first time, teachers tend to expect students to gain skills and understandings, not just information, from the textbook. The onus is now put on the textbook to provide not only *what* to learn but also the *means* to learn it.

Researchers have observed that students spend as much as 90% to 95% of classroom time interacting with textbooks. They also have reported that in many cases the textbook *is* the curriculum for the course. Clearly, textbooks have been gaining in importance. In fact, much of the current public interest in textbooks stems from the fact that the textbook is the only source of information a student will be exposed to on a given subject. Thus if the textbook covers a topic, it is assumed students will learn it and be influenced by it.

All this, of course, has affected textbook publishing, which has responded to various theories and fads – new math, inquiry method, teacher-proof materials, back-to-basics, and performance objectives at the beginning of chapters, to name a few. In some cases publishers paid dearly for hanging their hat on a bad idea, while others made large profits by including the latest innovations.

Today, there are complaints that textbooks are poorly written and avoid controversial issues. Critics also claim that using readability formulas in an effort to create lower reading levels actually results in text that is devoid of content and harder to read. If the critics are correct, why have publishers watered down their textbooks and catered to readability formulas? As the cartoon character Pogo says, "The enemy is us." As educators decided not to buy books that included controversial topics, the publishers responded. As they told publishers they wanted textbooks written at a reading level the slowest students could read, the publishers responded by using readability formulas resulting in short, choppy sentences, which are difficult to read. So who is to blame? And how do we go about correcting the situation? If we want well-designed and well-written textbooks that promote learning, we must tell publishers we will not settle for less.

Any teacher on a textbook selection committee wants to select the "best" textbook. Teachers want well-designed and well-written textbooks that help students learn. There is research that shows that there are some specific features of textbooks that promote learning in kindergartners through college students. What are these features and how do they relate to textbook selection? That is what this fastback is about. It provides information and methods for selection of textbooks in every subject matter and for every level from kindergarten through graduate school. Its suggestions and guidelines can be used for selecting any instructional material, whether it be workbooks, laboratory manuals, or computer programs – although we will emphasize textbooks here. By following the conceptual scheme described below, teachers will be able to select the best available textbooks and, at the same time, send a message to publishers that will result in even better texbooks in the future.

A Conceptual Scheme for Selecting Textbooks

Textbook selection procedures usually include a list of criteria that cover all the elements to be considered in selecting a textbook. After having looked at literally hundreds of selection criteria used throughout the United States, the authors found that certain criteria are *uniform* across all school districts. For example, virtually every set of selection criteria includes such criteria as up-to-date content (commonly determined by copyright date), accurate content, and unbiased treatment of minorities.

Another set of criteria *varies* among school systems. These criteria include such items as reading level and whether the textbook follows a predetermined syllabus. These varying criteria are an issue of *match/mismatch*; that is, when selectors decide that a textbook is not "good," what they really mean is that it does not match their syllabus or their teaching style. In rejecting a textbook solely on the ground that it does not match their needs and wants, selectors often overlook many of the textual features that researchers uniformly have found to promote learning.

Beyond the uniform and match/mismatch distinction, the authors have found that commonly used selection criteria fall into five major categories: 1) subject-matter content, 2) social content, 3) instructional design, 4) readability, and 5) production quality. Evaluating textbooks requires different kinds of expertise for each category. These five categories will serve as the organizing foci for the guidelines presented in the following chapters.

From the above discussion, it is clear that a textbook selection committee has a lot more to consider than simply whether a textbook covers basic subject-matter content. They often must consider whether it has the "correct" philosophy of teaching, the "correct" slant on politics and religion, the "correct" reading level, and myriad other things. "Correct" in one situation may not be "correct" in another situation, depending on the educational goals of the specific school district and community. How then should a selection committee proceed?

In selecting a textbook, the first step should be to analyze local needs. The term "needs," as used in this context, refers to both needs and wants. All those concerned, including students, parents, and members of the community, should help determine which needs of the community, the school, the teachers, and the learners the textbook should meet. The second step is to examine the textbooks under consideration to determine the extent to which they meet each of these needs. These are match/mismatch considerations. The third step is to address the uniform considerations.

An efficient method for organizing a selection commitee is to assign one member to assess one of the five categories for all textbooks under consideration for both match/mismatch and uniform criteria. This way, one person becomes the "expert" in a particular category and thus can make more informed comparisons among the textbooks.

The last step is to meet as a committee to discuss the relative merits of each textbook. Each committee member provides input for the category he or she was assigned to assess. Here it is most important that the committee address all match/mismatch and uniform considerations. This will require considerable weighing of each criterion as to its relative importance for students, teachers, and the community. It is unlikely that any textbook will meet all criteria or serve all needs. But the selection process will reveal weaknesses in the selected text and will indicate what supplementary materials or activities will compensate for those weaknesses. For example, an otherwise satisfactory book may cover the topics in the syllabus but not at the level of

sophistication the syllabus suggests. Knowing this, a teacher should plan to use supplementary materials to provide greater depth in the topic. Also, foreknowledge of instructional deficiencies in a textbook will alert teachers to sections that students are not likely to understand. In such instances, a few words of explanation before assigning a particular section or chapter can make all the difference in whether students will understand it. Thus, the textbook selection process does more than identify the best available textbook; it also provides guidance in selecting supplementary materials to overcome identified weaknesses.

Needs Analysis

In the process of selecting textbooks, some needs (including wants) are the same for all schools across the country. Therefore, no elaborate needs analysis is necessary because those needs are reflected in the uniform criteria. The purpose of a needs analysis is to address the ***unique*** needs of a community and its teachers and students. The first consideration in doing a needs analysis is that the purposes of the course should determine what is needed and, consequently, which textbook to select. In other words, you should know where you are going before you decide which road to take. This is the the primary purpose of a needs analysis.

Another purpose of a needs analysis is to avoid making a textbook selection on the basis of personal, idiosyncratic perceptions of the needs of the students, teachers, and community. A needs analysis provides the selection committee with a broader perception of needs before the textbooks are analyzed and ultimately selected.

A third purpose of a needs analysis relates to the selection of supplementary materials. With a needs analysis, a selection committee can compare what content needs to be covered with what is covered in the textbook. Thus the needs analysis helps determine how much and in what ways to supplement the textbook. However, keep in mind that addressing all the needs should not be the only consideration in selecting a textbook. A textbook may not address all the needs, but it may be the best available in terms of all the uniform criteria. It

usually is easier to supplement an otherwise good textbook with other materials than to try to compensate for its shortcomings with an inferior text that purportedly "covers" all the needs.

The textbook selection process also allows a committee to explore alternatives to selecting a new textbook. The committee might decide that no textbook does a good job of meeting identified needs. For example, some districts use hands-on science kits in their elementary schools instead of a textbook.

Finally, a word of caution about selecting a textbook "package" that includes such things as workbooks, activity sheets, pre- and post-tests, filmstrips, computer software, and posters. Each of these components of the package should be assessed separately, using the same criteria as the textbook assessment. If they are not good, they are not worth the extra money charged for the package. In fact, the need for these supplementary materials in the package will vary depending on how good the textbook is. So, what and how much supplementary material is needed should be addressed *after* the textbook is selected.

Preparing Needs Statements

A selection committee should prepare needs statements for each of the five major categories: subject-matter content, social content, readability, instructional design, and production quality.

Subject-Matter Content. Many school systems have locally developed syllabi or use some form of standardardized testing. For example, in the state of New York, high school students who enroll in the more academically challenging Regents courses take Regents Examinations, which are administered by the state. Great emphasis is placed on how closely the textbook "follows" the Regents syllabi and examinations. Therefore, this becomes an important match/mismatch criterion. The needs analysis might result in a checklist of knowledge and skills to be acquired by the end of the course. Then the textbook analysis would determine which of those needs are or are not addressed. The needs analysis also should identify and list desirable attitudes ex-

pressed in the content (for example, civic responsibility) and important problem-solving, critical-thinking, and other "general" skills that should be attained in the course.

Another aspect to consider in this category is an analysis of learners' prior knowledge. Where the course builds on prior knowledge and skills, such as in English or mathematics, the selection committee must be careful that the textbook does not assume students enter the course with more knowledge than they have. The committee also must be careful that the textbook does not repeat a lot of concepts and skills students already have learned.

Again, avoid placing too much emphasis on the match/mismatch of subject-matter content. Remember that it is easier to supplement an otherwise good text with other materials than to compensate with an inferior text that superficially "covers" all the subject matter.

Social Content. A needs analysis of social content must take account especially of parental and community attitudes as well as those of students and teachers. A selection committee might ask: "What view do we want portrayed regarding stereotypes (race, religion, ethnic groups, or sex) and values (equity versus achievement, competition versus cooperation, diversity versus homogeneity, nuclear family versus alternative family structures, ecological consciousness versus economic development, sex within marriage versus sex in committed relationships)?" Some school districts may already have established such social content criteria as "Sex-role stereotyping will not be used in depicting family life." The selection committee should observe such criteria as it reviews textbooks.

Generally, the needs analysis in this category should reflect the school district's stance on ethnic, racial, socioeconomic, religious, and political issues, and should identify to what extent each social content issue should be addressed in the curriculum. An important consideration in this category is what issues have tended to cause controversy in the past. However, while school officials may want to avoid controversy, it should not be the only consideration in textbook

selection. Again, once a textbook has been selected, it can always be supplemented with other materials or activities to address any unmet needs.

Readability. Needs analysis for this category involves determining the reading ability of the students. Standardized reading tests are the most common way of doing this. However, there are many aspects of reading ability that a single test score does not reveal. These include how fast one can read (reading rate), how much one can remember (recall), how well one understands (comprehension), and how many words one knows (vocabulary level). A single test score is usually insufficient for making informed decisions about the readability level of textbooks. It may be necessary for the selection committee to do some informal testing using passages from the textbooks under consideration.

When analyzing textbooks for readability levels, selection committees must tread a thin line between choosing one that is too difficult and one that is too easy. Obviously, if the reading level is too difficult, students will struggle to learn the content. If it is too easy, students will not be challenged to improve their reading abilities, and they may become bored.

Instructional Design. When one textbook is selected for use by several teachers, problems may arise because teachers have different teaching styles. This means that different teachers will need different instructional design features in their textbooks. For example, teachers who use a mastery approach will need certain diagnostic and remediation features that other teachers will not need. Teachers who use a discovery approach will need different texts from those who use an expository approach. The needs analysis statement should list the instructional features teachers prefer. If teachers provide input into the selection process, it will greatly influence their satisfaction with the textbook – even though some compromises may be necessary.

Production Quality. The cost of textbooks is a major concern to most school systems and must be addressed in the needs analysis.

There is a trade-off between cost and durability; cheap books do not last as long. There is also a trade-off between cost and appearance; full-color photographs cost more. Before a selection committee makes decisions about cover, binding, paper, and color, it must ask some basic questions. How much can the district afford to budget for textbooks? How many years must the books last? How much is color really needed? The needs analysis should address these questions.

With the needs analysis completed in each of the five categories, the selection committee is now ready to examine and evaluate the textbooks using the same five categories. The following sections provide guidelines for evaluating textbooks in the first four categories. The fifth category, production quality, is adequately covered in the above paragraph.

Evaluating Subject-Matter Content

This category deals with the historical function of textbooks – as a compilation of knowledge on a given subject. Teachers tend to have more expertise in this category than in the other four, so it tends to get the most attention.

Match/Mismatch Criteria

When evaluating textbooks, teachers first want to know if it covers what they teach. Does it match what is in the state or local syllabi? The needs analysis yields information about what content is needed. The task now becomes one of analyzing each textbook, marking on a checklist the content or topics it covers, and comparing the list with the content needs. Reviewers should be alert to whether a topic is treated in some depth or just mentioned. In an effort to reach the widest possible market, some textbook publishers claim that their books "cover" all the topics in a syllabus; but closer examination reveals that certain topics are only mentioned and do not provide enough content for real learning to occur. One way a reviewer can check out a publisher's claim is to take a random sample of at least 20 or so topics from the content needs list and see how completely the textbook treats them.

Some states, such as California, increasingly are concerned with the teaching of general skills. General skill development is a concern

across grade levels and content areas. Problem-solving and critical-thinking skills are as much a part of social studies as they are of mathematics, and such skills are needed as much in kindergarten as they are in college-level courses. Thus a reviewer should analyze the general skills in textbooks in much the same way as subject-matter content.

Uniform Criteria

The two major uniform criteria used in evaluating textbooks are currency and accuracy. Copyright date is the most widely used means for determining content currency. Authors' credentials commonly are used to determine the accuracy and authoritativeness of the content.

Without going into some of the questionable practices of publishers with regard to copyright dates and authorship, suffice it to say that copyright date and authors' credentials do not necessarily make a textbook's content up-to-date and accurate. But what alternatives are there?

In terms of currency, if a textbook is a new edition of one previously published, the promotion material for the new edition usually has a list of topics that have been revised and new topics that have been added. By comparing the old and new editions, a reviewer can get a general idea about how current the material is. In terms of accuracy, the credentials of consultants or subject-matter reviewers listed in the front of textbooks may be a more valid measure of content accuracy than the authors' credentials. Most K-12 textbooks are created by a team consisting of a senior author or authors, subject-matter experts, teacher consultants, and editors. Relying solely on the senior author's credentials leaves out many important members of the team.

Social Content

The social content category in the textbook selection process is one that may arouse controversy. The media have carried several reports of a selection committee's decision being overturned when a local group in the community was offended by some of the social content in adopted textbooks.

The textbook is often a student's only source of information on a given topic, so what is in the textbook is extremely important. Hillel Black (1967) captures the importance of textbooks with these words:

> [S]choolbooks over the decades have embodied most of the nation's beliefs and prejudices. As the most important educational tool of the past and the present, the textbook is instrumental in molding the attitudes and passions of the young and thus both reflects and shapes the beliefs of the nation itself.

The textbook, as the major source of information, becomes even more important when it is perceived as carrying overt or covert messages that mold student attitudes and values. And when the textbook's message does not conform to parents' beliefs, a school district is likely to become embroiled in a bitter controversy. Hence, this category is indeed an important one.

Match/Mismatch Criteria

What to teach, or not to teach, about religion, politics, death, war, and sex are not easily resolvable issues for educators. Some values

are uniformly held across the country, but others vary from one locale to another. Through the needs analysis, the selection committee identifies the community's attitudes and values on a variety of social content issues. It then compares them with educators' perceptions of students' needs and reaches consensus on those social content needs to be addressed in the curriculum. The reviewer then analyzes each textbook with a checklist to see the extent to which each of the local social content needs is addressed.

Uniform Criteria

Uniform criteria for social content in textbooks tend to be those civic values reflected in the U.S. Constitution. This includes such things as respecting the rights of others and equity for all races, ethnic groups, and sexes. Blatant racism and sexism have gradually disappeared from most textbooks. What may linger is more subtle bias reflected by a photo caption such as, "This woman is employed in a factory and does all the work expected of men doing the same job."

Subtle bias also may be found in the treatment of some minority and ethnic groups. The authors found one list of criteria on social content that warns reviewers to be alert for ethnic groups being depicted as "quaint or colorful," one career referred to as more "important" than another, and some regional groups being described generally as "intolerant."

In essence, uniform criteria call for unbiased and equal treatment of all groups in our society – racial, ethnic, religious, regional (South, North, rural, urban), handicapped, occupational, political, socioeconomic, family (single-parent families), sex, and age groups. Uniform criteria also call for reinforcement of certain contemporary values. For example, with the mobility of students in today's society and their exposure to many cultures and points of view, respecting and valuing diversity has become a commonly accepted goal.

Publishers, in response to pressures for a more representative portrayal of various groups in contemporary society, have sometimes

been overzealous in their efforts. For example, one recently published health text depicted only single-parent and extended family groups in photographs. The traditional nuclear family was nowhere to be seen. Clearly, this was an overreaction to a legitimate request for textbooks to portray various forms of contemporary families.

One final word of caution regarding balanced presentation in textbooks: it has become a common practice to count the number of pages or paragraphs devoted to a social issue or a minority group to determine balanced treatment. This is often misleading because it is not the number of pages but the substance of what is said that ultimately determines balanced treatment. The same is true of counting illustrations. Counting the number of illustrations no doubt is a quick way to determine balanced treatment, but perhaps more important are what the illustrations show and what the captions say.

Readability

More often than not, a reviewer assesses the reading level of a textbook on the basis of some readability formula. Or the publisher's representative or promotional material tells the selection committee what the reading level is. The most commonly used readability formulas are based on sentence length and the number of difficult words used. The readability formula is applied to a sampling of passages in a text, some calculations are made, and the result is a specific grade-level designation. The precision of a mathematically calculated grade level holds great appeal for a textbook selection committee that wants to make sure that students will be able to read the text. And, of course, publishers use this to the fullest in their promotional material.

Recently there has been a hue and cry about the use of readability formulas for writing textbooks. Writing to a formula results in text that is little more than a compilation of short, choppy sentences. Moreover, the writing lacks any of the grace and style found in nonfiction and fiction books for children. Critics say text written to a formula is difficult to read; and the short, choppy sentences are often monotonous and boring when strung together in discourse.

Despite these criticisms, it is still a common practice to select textbooks using a readability formula to match students' reading abilities. No doubt this is because readability formulas are relatively easy to use and probably are better than nothing. But there are more effective ways to determine whether a textbook is readable. They involve

more complex factors than sentence length and vocabulary load. One such method coming into wider use is called "discourse analysis."

Discourse Analysis

Readability is a composite of factors that make textual material easy to understand. Discourse analysis looks at four factors that contribute to understanding: appropriateness, cohesiveness, unity, and textual structure. Each of these factors is discussed below.

Appropriateness. Textual material is appropriate if it provides what the student needs to learn and is presented at a level that the student can understand. Appropriateness also must take account of the cultural or socioeconomic background of the learner. Just as some standardized and IQ tests were found to be culturally biased, so a textbook can be difficult to read for students whose cultural backgrounds did not provide exposure to some of the concepts in the textbook.

The needs analysis should determine what the learner already knows (prior knowledge). This includes not only content but also information on language facility, cultural experiences, and learning styles. When presenting new content, especially vocabulary, it is important that it be related to students' prior knowledge. Therefore, appropriateness, as a factor in readability, must consider the whole student, not just a reading level as measured by a readability formula.

Cohesiveness. This factor deals with the logical relationship of ideas and how they flow in the text. Cohesiveness is achieved through use of connectives, transition words, and repetition of key words. For example, if a paragraph reads, "One brain region is called the cerebrum. The cerebrum is . . ." then the word "cerebrum," an important vocabulary word, connects the two sentences. The first sentence is semantically bound to the next sentence by the repetition of a key word. Of course, too much repetition can make the writing uninteresting.

Transition words also contribute to readability. For example, in the sentence, "The cerebrum controls . . ., while the cerebellum, an-

other region of the brain, controls . . ." the transition word "while" signals the reader that a new idea is coming, but it is connected to the first part of the sentence. Other transition words such as "therefore" and "however" signal the reader that a change of thought is coming. Cohesive devices contribute to readability by focusing the reader's attention on one main idea. Then, when there is a change of idea, they signal the change.

Unity. This factor may be the most important one for assessing readability. Unity has to do with how well the discourse sticks to an implicit or explicit (stated) purpose. Many textbooks now have a list of objectives at the beginning of each chapter, usually written in behavioral terms: "Students will be able to *explain* . . ." But sometimes when one examines the discourse on the topic, it is only a collection of facts and in no way prepares students to "explain" anything. This is an example of disunity.

An easy method to determine if the text has unity is to match the kind of discourse with its purpose, whether explicit or implicit. First, classify the discourse as: 1) a collection or listing of information, 2) cause and effect, 3) problem and solution, 4) compare and contrast, or 5) straight description. Then check to see if the discourse is compatible with the purpose, which may be explicitly stated in an objective or implicitly stated in an introduction to the topic.

It is also important that the rate at which information is presented (information load) be compatible with the purpose. The discourse should not be a mass of detail and should not contain extraneous and distracting information. The information should come at a rate that allows students to process it (not so fast as to bombard them with facts and figures and not so slow as to bore them). When presenting a difficult topic or concept, both cohesiveness and unity contribute to readability.

Textual Structure. This factor deals with how text is organized on a page or within a chapter. Research has shown that the way text is organized typographically (headings, spacing, bold face, italics, etc.)

can affect both reading rate and comprehension. Elements of textual structure are especially helpful to poor readers.

A good indicator of effective textual structure is whether readers can state clearly the theme or main idea and can structure ideas in order of importance. With material that has good textual structure as well as cohesiveness and unity, this is quite easy to do.

Other aspects of textual structure include illustrations, graphs, charts, marginal notes, and captions – all of which can influence comprehension. These will be discussed in greater detail in the section on instructional design.

Other Considerations. Readability also is influenced by other factors, including concrete specific language, use of the active voice, variety in sentence structure, avoidance of unnecessary words, and shorter but not choppy sentences.

Readability formulas help selection committees determine whether students can read a textbook. But their use for prescribing how to write a readable book has weakened other aspects of readability. Appropriateness, cohesiveness, unity, textual structure, instructional design features, and just plain good writing also must be considered.

Instructional Design

Researchers in instructional design have developed and validated principles for making textbooks effective instructional tools. In this chapter we present an overview of the principles of instructional design, which selection committees can use in evaluating textbooks.

Instructional design can be divided into three categories: *macro-level* considerations, *micro-level* considerations, and *message design* considerations. The macro-level includes such things as the scope and sequence of a course or curriculum, the use of synthesizers to teach interrelationships within subject matter, and the use of systematic review to improve retention. The micro-level includes techniques for teaching a single concept or skill using examples, practice, and feedback; for providing context and for processing content to achieve understanding; and for using mnemonics, analogies, highlighting, and visuals to facilitate learning. Message design includes instructional elements related primarily to page layout. Central to each of these three categories of instructional design are motivational techniques for maintaining students' attention, for showing students the relevance of the content, and for building confidence and student satisfaction.

Instructional design criteria should apply not only to a textbook but also to all the ancillary materials that accompany a textbook (teacher's manual, workbooks, worksheets, tests, etc.). For example, one instructional design criterion is the amount and kind of practice provided. The practice may be provided in worksheets or workbooks as well

as in the textbook itself. Nevertheless, the practice is designed for material in the textbook, so the selection committee should evaluate the ancillary materials with the same scrutiny as it does the textbook.

Match/Mismatch Criteria

Match/mismatch criteria for instructional design deal with a teacher's instructional style or approach. For example, teachers using a mastery learning approach will need certain diagnostic and remediation features. Teachers using an inquiry approach will need materials (not necessarily textbooks) that provide for hands-on, laboratory-type learning. Still other teachers using an individualized instruction approach will prefer textbooks with self-pacing features.

Uniform Criteria

Uniform criteria to be addressed in textbook selection cover macro-level, micro-level, message design, and motivational considerations.

Macro-Level Criteria. Three major considerations in this category are sequencing, synthesis, and systematic review. Sequencing is important, because in order to learn new concepts and skills, one must build on what has been previously learned. Prior knowledge is a most important factor in sequencing content because it provides a context for learning new content. It provides links for comprehending and remembering information. In sequencing content, it should go from simple to complex, from observable to abstract, with a gradual elaboration of basic knowledge and skills. Various ways this can be done have been proposed by Bruner's spiral curriculum (1960), Ausubel, Novak, and Hanesian's progressive differentiation and advance organizers (1978), and Reigeluth's elaboration theory (1987).

In assessing the simple-to-complex sequence, a selection committee should determine whether a textbook treats a topic in some depth once and never returns to it later, or whether the text spirals back to each topic several times during a course. Dealing with each topic

only once may be appropriate if the textbook is used only as a reference book. But spiralling back affords systematic review and facilitates comparison and integration with other topics. This spiralling back feature has gained importance in the recent reconfiguration of the high school math curriculum, which traditionally offered algebra one year, geometry the next, then trigonometry and solid geometry. In reconfiguration, many of the math topics are covered in greater detail each year.

Two other macro-level considerations are synthesis and systematic reviews. Synthesis in the form of overviews and systematic reviews in the form of summaries help to structure content and integrate new information. These can take many forms, including concept diagrams or other visual displays, chapter introductions, an index, or a glossary. One form of synthesizer used in better textbooks relates a topic to what has been learned previously. For example, a textbook may compare and contrast the causes of one war with the causes of another studied earlier. These instructional design elements help students to process and retain information.

A quick way to assess the macro-level design of a textbook is to examine the table of contents, chapter introductions, end-of-chapter summaries, index, and glossary. Also, the teacher's edition often will discuss the rationale for the scope and sequence of a textbook or textbook series.

Micro-Level Criteria. This category deals with how to teach a single piece of content such as a concept or principle. Specifically, each piece of content should include presentation, practice, and feedback. Different kinds of content require different forms of presentation, depending on whether the content is in the cognitive, motor, or affective domain. And within the cognitive domain, the presentation will differ depending on the level of cognitive learning.

Researchers have come up with different classifications of cognitive levels of learning, but they all are similar to Bloom's taxonomy. For example, in economics the law of supply and demand, like many

pieces of content, can be learned by memorizing it (knowledge), understanding it (comprehension), or applying it (application). The three higher levels of Bloom's taxonomy – analysis, synthesis, and evaluation – are general skills, which can be applied across subject areas. They include critical-thinking skills, problem-solving skills, and learning strategies.

The different levels of cognitive learning require very different methods of instruction. For the application level, the presentation should consist of a generality and a variety of examples. The practice should present different situations that require the learner to apply the generality as it was applied in the examples. For example, if a textbook includes a lesson on "nouns," there should be a definition or explanation of a noun, then different examples of nouns, followed by practice on recognizing nouns in sentences. The practice might be in a workbook or on worksheets. Similarly, in a presentation on word meanings (vocabulary), the generality is the word definition, followed by some examples, and then some practice requiring the student to use the word in sentences. The presentation also might make reference to prior knowledge of similar words or cognates that help to define the new word.

In addition, there should be feedback on the practice. One way of doing this is having answers to problems in the back of the textbook. This is done in some college texts but rarely in K-12 textbooks. Providing immediate feedback, including corrections, does facilitate learning.

Instructional design also includes prescriptions for making it easier to learn certain content. These include mnemonics (memory devices), such as Roy G. Biv for the colors in the spectrum (red, orange, yellow, green, blue, indigo, violet); analogies, such as comparing electrical systems to water systems; alternative presentations, such as paraphrasing or use of visuals; and study questions to guide students' thinking.

Recently there has been an emphasis on having textbooks foster the general skills of learning how to learn and how to think. Students

who have been taught specific how-to-learn strategies perform better on criterion-referenced tests. Similarly, instructing students in strategies for learning from textbooks facilitates learning. Selection committees should look for these instructional design features when choosing a textbook.

Selection committees also should look for congruence between the stated objectives and the specific content provided to achieve those objectives. Lack of congruence is more prevalent in textbooks than any other instructional design element. There must be a content match, as discussed in the unity section on discourse analysis, but also a level-of-learning match. Often an objective will state that learners should *apply* their knowledge, but the textbook only provides a definition to be memorized. Learners also need examples, nonexamples for comparison, and practice in order to apply their knowledge. For example, if the objective states, "Students will be able to classify animals as reptiles or non-reptiles," the text should not only define the characteristics of reptiles but also present examples and ask questions that require the student to classify different animals as reptiles and non-reptiles. And the practice or tests should require students to classify other animals, those different from the ones used in the text.

Message Design. This category deals with how textual material is displayed to facilitate text processing. It includes a variety of techniques that help students to focus on important points and to process the information. These include highlighting, use of visuals, and patterning cues.

Highlighting is used to tell students that an idea or term is important and that they should pay attention to it. Highlighting can be done by using italic or boldface type, also by use of color, different typefaces, arrows, bullets, and boxes. All these message design elements can help the reader. However, if they are overused, they negate the purpose of highlighting.

Visuals also can enhance student comprehension. To be effective, visuals should be relevant to the text on the page and should not be

too complex. For example, a full-color photograph may contain too many details, whereas a line drawing helps the student to focus on the critical features. Captions with visuals should direct the reader to what to look for. Research has shown that when both text and a visual, such as a chart or graph, cover the same information, students tend to read the text and ignore the visual – unless the text includes specific questions that direct the student to the visual to find the answers.

Patterning cues are structural devices on the page that help students process information. They are often in the form of marginal notes or headings. Markers such as "example," "practice," or "main idea" can be very helpful in calling the reader's attention to key points in the content.

Motivational Strategies. The motivational aspects of instructional design deal with the *appeal* of the instruction. Motivational strategies have a direct effect on students' effort and hence on their learning. One such strategy is the use of vivid visuals to put across a main idea. Visuals help students to remember better than words do. Another is use of realistic case studies, which are relevant to students' lives and involve them emotionally. Still another is an easy-to-difficult sequence in practice exercises, allowing students to gain confidence with easier material before going on to the more difficult. Thought-provoking questions and even physical activity allow students to engage in active learning. Use of humor also can increase the appeal of a textbook. John Keller (1983) summarizes motivational strategies in four words: Attention, Relevance, Confidence, and Satisfaction.

Conclusion

A textbook selection committee should assess more than just the subject-matter content in a textbook; it should also assess its social content, readability, instructional design features, and production quality. Within these these five categories, the committee should consider uniform criteria and those match/mismatch criteria unique to its school district. To meet the unique criteria, there is no substitute for a careful needs analysis before analyzing the textbooks under consideration. Equipped with this knowledge, the selection committee not only will get the best available text for their needs but also will send to publishers a message that will result in even better textbooks being available in the future.

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Appendix

A Summary Checklist of Match/Mismatch and Uniform Criteria for Selecting Textbooks

Subject-Matter Content

Match/Mismatch

- Skills, knowledge, attitudes: Congruence with state/local syllabus, locally mandated curriculum, achievement tests, and teacher judgment of student needs.

Uniform

- Accuracy: Author and consultant credentials; assessment of content.
- Currency: Comparison with previous editions; assessment of content.

Social Content

Match/Mismatch

- Values: Congruence with local community, school, and teacher values.
- Controversial issues: Congruence with any previous community challenges.

Uniform

- Values: Congruence with constitutional and general societal values.

- Unbiased treatment of racial, ethnic, religious, regional, career/job, political, socioeconomic, family, handicap, age, and sex roles.
- Reflects multi-ethnic character of the country.
- Supports positive attitude toward diversity.

Readability

Match/Mismatch

- Reading level (however determined).
- Prior knowledge: Previous courses, skills assessment.
- Cultural and sociological appropriateness.
- Information rate.

Uniform

- Appropriateness: Prior knowledge, cultural slant, social slant.
- Cohesiveness: Use of connectives; clear referents.
- Unity: Match kind of discourse with purpose/objective; repetition and low density of vocabulary.
- Structure: Topics typographically segmented; theme and main idea can be mapped hierarchically.
- Well-written: Concrete, specific language; use of the active voice; variety of sentence structure; avoidance of unnecessary words; and shorter but not choppy sentences.

Instructional Design

Match/Mismatch

- Congruence with teacher's style and approach: Mastery, inquiry, individualization, hands-on approach.

Uniform: Macro-Level

- Analyze the table of contents, end-of-chapter summaries, beginning paragraphs, index, and glossary; review teachers' edition for discussions on scope and sequence.
- Sequence: Simple to complex, spiralling (recycling).

- Synthesis and review: Concept diagrams, overviews, summaries, synthesizers, glossary, index.

Uniform: Micro-level (analyze all ancillary materials)

- Routine components: Text/ancillaries include presentation, practice, and feedback.
- Levels of learning: Presentation will vary depending on whether the level is memorization, understanding, application, or generic higher-level skills.
- Instructional support: Use of mnemonics, analogies, alternate representations, focus questions, etc.
- Objectives and content congruence: Match cognitive level of objectives with level of learning in text and ancillaries.

Uniform: Message Design

- Highlighting: Use of italics, boldface, typeface, arrows, boxes, color for emphasis. Avoid overprompting.
- Visuals: Relevant, not too complex, focus on one message, captions control interpretation.
- Content markers appropriately used for text-processing.

Uniform: Motivational Strategies (attention, relevance, confidence, satisfaction)

- Visuals: Vivid and active.
- Examples: Relevant and realistic case studies.
- Practice: Easy-to-difficult sequence to build confidence.
- Active learner involvement: Thought-provoking embedded questions.
- Link abstract concepts to familiar situations.

Production Quality

Match/Mismatch

- Sturdiness of cover, binding, paper: Congruence with projected use.
- Print: Size, style, color, and spacing appropriate for age level of students.

- **Cost:** Depends on projected use of textbook and ancillaries.
- **Size:** Easy-to-carry; use depends on users.

Uniform

- **Quality of print:** No broken type, poorly cut pages.
- **Format:** Spacing and layout not crowded.
- **Color:** Registration.
- **Paper:** Non-glare.

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